

CLAIMS

[1] A vertically filling-packaging device for filling contents, through a filling mechanism, into a packaging bag formed by: forming a film delivered from a film roll into a cylindrical shape; longitudinally sealing the film by a longitudinally sealing mechanism; and laterally sealing the film by a laterally sealing mechanism, characterized by comprising: a rotating mechanism for rotating a pair of heat seal rolls composing said laterally sealing mechanism; and a vertically moving mechanism for moving said heat seal rolls upward and downward.

[2] A vertically filling-packaging device as set forth in claim 1, characterized: in that the downward movement of said heat seal rolls is started from the instant when said film is clamped by seal plates individually attached to said paired heat seal rolls and having a predetermined seal width; and in that said heat seal rolls are moved upward at the instant when said seal plates shift from the clamping state to clamp said film to a non-clamping state, thereby to return said heat seal rolls to an action original point.

[3] A vertically filling-packaging device as set forth in claim 1, characterized: in that said film is clamped by seal plates individually attached to said paired heat seal rolls and having a predetermined seal width, when said paired heat

seal rolls begin to move downward; and in that said heat seal rolls are moved upward at the instant when said seal plates shift from the clamping state to clamp said film to a non-clamping state, thereby to return said heat seal rolls to an action original point.

[4] A vertically filling-packaging device as set forth in any of claims 1 to 3, further comprising first drive means for rotationally driving said heat seal rolls, second drive means for rotationally driving a delivery screw belonging to said vertically moving mechanism, and control means for electrically controlling said first and second drive means, characterized in that said control means controls said first and second drive means so that the sum of $V_1 + V_2$ may be substantially equal to a feeding velocity V of said film, in case said seal plates belonging to said heat seal rolls have a rotating circumferential velocity V_1 and in case said heat seal rolls have a downward velocity V_2 by said vertically moving mechanism.

[5] A vertically filling-packaging device as set forth in any of claims 1 to 4, characterized: by further comprising a cutting mechanism disposed on the downstream side of said laterally sealing mechanism for cutting a packaging bag series formed by said laterally sealing mechanism; and in that said cutting mechanism includes a vertically moving mechanism for the cutting mechanism for moving upward and downward in

synchronism with said vertically moving mechanism of said laterally sealing mechanism.

[6] A vertically filling-packaging device as set forth in claim 5, characterized in that said cutting mechanism cuts said packaging bag series in case said film is clamped by said seal plates belonging to said paired heat seal rolls of said laterally sealing mechanism.

[7] A vertically filling-packaging device as set forth in claim 5 or 6, characterized: in that said cutting mechanism includes an opening/closing mechanism having a pair of film holding plates for clamping the sealed portion of said packaging bag series for opening/closing said film holding plates by third drive means, fourth drive means for moving said cutting mechanism vertically moving mechanism upward and downward, and fifth drive means for activating a cutting member to cut said packaging bag series; and in that control means for electrically controlling said third, fourth and fifth drive means controls said fourth drive means of said cutting mechanism vertically moving mechanism so that said film holding plates may move downward in synchronism with the downward movement of said packaging bag series, said third drive means so that said sealed portion of said packaging bag series may be clamped by said paired film holding plates, said fifth control means so that said sealed portion may be cut by said cutting member at a predetermined timing while said sealed

portion being held by said film holding plates, and then said third and fourth drive means so that said paired film holding plates may perform the opening action and the upward movement without obstructing the downward action of the packaging bag series having the seal portion to be next cut.

[8] A vertically filling-packaging device as set forth in claim 7, characterized in that said control means controls said third and fourth drive means in said opening/closing mechanism and said cutting mechanism vertically moving mechanism so that said paired film holding plates may extend along the shape of a packaging bag.

[9] A vertically filling-packaging device as set forth in claim 1, characterized in that said filling mechanism performs the feeding action of said contents continuously.

[10] A vertically filling-packaging device as set forth in any of claims 2, 3, 4 and 6, characterized in that said seal plates are formed to have a generally arcuate seal face.

[11] A bag forming method of a vertically filling-packaging device for filling contents, through a filling mechanism, into a packaging bag formed by forming a film delivered from a film roll into a cylindrical shape, longitudinally sealing the film by a longitudinally sealing mechanism, and laterally sealing the film by a laterally sealing mechanism, and including a rotating mechanism for rotating a pair of heat seal rolls composing said laterally sealing mechanism, and a vertically

moving mechanism for moving said heat seal rolls upward and downward, characterized by forming a laterally sealed portion on said film by arranging seal plates formed to have a predetermined seal width at said paired heat seal rolls, by clamping said film being continuously delivered by rotating said paired heat seal rolls, by said seal plates, by moving said seal plates downward together with the film being delivered, and by rotating said seal plates continuously during the downward movement.

[12] A bag forming method of a vertically filling-packaging device as set forth in claim 11, characterized in that said filling mechanism performs the feeding action of said contents continuously.

[13] A bag forming method of a vertically filling-packaging device as set forth in claim 11, characterized in that said control means controls said first and second drive means so that the sum of $V_1 + V_2$ may be substantially equal to a feeding velocity V of said film, in case said seal plates belonging to said heat seal rolls have a rotating circumferential velocity V_1 and in case said heat seal rolls have a downward velocity V_2 by said vertically moving mechanism.

[14] A bag forming method of a vertically filling-packaging device as set forth in any of claims 11 to 13, characterized in that the vertically filling-packaging device further comprises a cutting mechanism disposed on the downstream side

of said laterally sealing mechanism; and in that said cutting mechanism moves upward and downward in synchronism with said vertically moving mechanism of said laterally sealing mechanism.

[15] A bag forming method of a vertically filling-packaging device as set forth in claim 14, characterized in that said cutting mechanism cuts said packaging bag series in case said film is clamped by said seal plates belonging to said paired heat seal rolls of said laterally sealing mechanism.

[16] A bag forming method of a vertically filling-packaging device as set forth in claim 14 or 15, characterized: in that said cutting mechanism includes a pair of film holding plates for clamping a sealed portion of said packaging bag series, and a cutting member for cutting said sealed portion; and in that: said film holding plates move downward in synchronism with the downward movement of said packaging bag series; said sealed portion of said packaging bag series is clamped by said paired film holding plates; said sealed portion is cut by said cutting member at a predetermined timing while said sealed portion being held by said film holding plates; and then said paired film holding plates perform the opening action and the upward movement without obstructing the downward action of the packaging bag series having the seal portion to be next cut.

[17] A bag forming method of a vertically filling-packaging device as set forth in claim 16, characterized in that said

paired film holding plates perform the opening action and the upward movement along the shape of the packaging bag.